

Determination of occlusal relationship (1st molar + canine) among 9-10 year old boys in Tehran

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Abstract

Aim: Disorders of dentition and gums are highly common in contemporary societies and its prevalence is increasing gradually. All psychological and social problems due to dentofacial esthetics and oral function and periodontal disease deterioration and dental caries has made orthodontic treatments important and considering that the relationship of molars is the key to occlusion, this study examines the occlusion relationship (1st molar- canine).

Materials and methods: 1800 students aged 9-10 from 20 regions of Tehran were randomly selected and studied using cross-sectional method. After excluding mentally retarded and aberrant ethnicities and those with previous orthodontic treatment from sample size, the remnants were examined as 5 groups (class I, class II, class III, different right and left, unidentifiable) based on Angel classification.

Results: 48.4% of subjects were identified to have class I occlusion, 25.6% class II, 6.7% class III, 15.9% had different right and left, and 3.3% had unidentifiable occlusion.

Conclusion: the prevalence of normal occlusion in this study was much lower compared with similar studies in other parts of the world and in Iranian literature as well. Malocclusion showed an ascending fashion; disagreement of class I and II malocclusions with similar Iranian and foreign studies seem to explain genetic background, type of diet, differences in instrument and measurements, and sample size and ethnicity and other factors.

Keywords: Occlusion, 1st permanent molar, Deciduous canine, Malocclusion

Disorders of dentition and gums are much common among contemporary societies and apparently its prevalence has been increased gradually. The most extensive study on occlusion relationships so far suggested that 75% of American children and adolescents are far away from ideal occlusion.¹

Psychosocial problems caused by dentofacial esthetics, oral dysfunction and dental vulnerability to insults, and periodontal disease deterioration due to dental caries have made orthodontic treatment valuable in recent years.² Then, it is necessary to determine the prevalence rate of dentition disorders amongst various regional and ethnic populations in our country in order to achieve criteria to identify etiologic factors, orthodontic treatment prioritize and especially preventing their occurrence.¹ This study evaluates the prevalence of malocclusion

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and occlusion (1st molar-Canine) status among 9-10 year old boys in Tehran.

Materials and methods

20 regions of Tehran organization of education were divided into 3 groups: 1-6, 7-14 and 15-20. One region was randomly selected from these groups. The study population was 9-10 year old boys in regions 5, 11 and 17 of Tehran. According to cluster sampling 1800 persons were selected for this study. This study was a cross-section and interview, inspection, physical examination and information recording forms were used for data collection. This information recording forms included patient age, mental status, previous orthodontic treatment and ethnicity. Mental retarded children and non-Iranians ethnicities and also those with previous orthodontic treatment were excluded from the study; after physical examination of right and left molars relationship, the remnants were classified into 5 groups. 3 groups were based on Angel classification and 2 other distinct groups which included cases unclassifiable as Angel.

1st group=class I

2nd group=class II

3rd group=class III

4th group= different (right and left occlusions were different)

5th group=unidentifiable (due to severe dental caries of 6, sufficient eruption of 6, bruxism, unerupted of 6, anterior and posterior cross bite, and premature contact). Moreover, those with class I molar and canine occlusion, normal overjet

(3-4 mm), normal overbite (1-2 mm) without cross bite was considered as normal occlusion. Relationship of deciduous canines were evaluated as same as molars. Non evaluable over-jet and over-bite cases were excluded from the study (because of

the reasons we had for over-jet). 1-2 mm over-bite considered as normal.

Results

After exclusion of the persons with previous orthodontic treatment and mentally retarded and non Iranian ethnicities, 1738 out of 1800 subjects were examined; and these were results: the occlusion status of 1st molar in 9-10 year old boys showed that 48.4% of the sample were class I, 25.6% were class II, 6.7% were class III. 15.9% of subjects had different right and left occlusions. In addition, 3.3% of subjects were unidentifiable. In terms of normal occlusion and malocclusion, 44.6% of class I had malocclusion and 3.8% had normal occlusion, 25.6% of subjects had malocclusion class II and 6.7% had malocclusion class III.

However, regarding occlusion in deciduous canine teeth, 52.9% of subjects had class I, 13.1% class II and 5.4% had class III occlusions. 11.5% of cases had different right and left canine occlusions while 17% were unidentifiable. With respect to 1st molar occlusion and deciduous canine occlusion, our study showed that 89.6% of subjects with class I molar occlusion also had class I canine occlusion. Of subjects with class II molar occlusion, 50.8% had class II canine occlusion as well and finally, from subjects classified as class III molar occlusion, 40% were identified to have class III canine occlusion. Kappa agreement coefficient between occlusions in canine and molar teeth was 0.458 (0.458 ± 0.026) suggesting relatively desirable agreement.²² As the subjects in classes I, II and III occlusion were included in this comparison, sample size in this table equaled to 1063.

Overjet status revealed that most common condition was decreased overjet (0-3mm) and after that normal overjet (3-4mm). The least common was increased overjet (>7mm)

that equaled to 0.5% of study subjects. Moreover, the mean overjet among class I, II and III was 1.9mm, 3.1mm and -1.2mm, respectively. Evaluating overbite showed that the most common state was normal overbite (1-2 mm) and then increased overbite (2-5 mm). In addition, 6% of subjects had anterior open bite.

The means of overbite in class I, II and III were 1.7 mm, 2.3 mm and 1.4 mm, respectively.

44 of examined subjects, which are 2.5%, had anterior cross bite and 12 subjects, 0.7%, had posterior cross bite. Apparently, anterior cross bite is 4times more prevalent than posterior cross bite

Table 1. Frequency of first molar occlusion among 9-10 year old boys in Tehran

	frequency	count	percent
Molar occlusion			
Class I		841	48.4
Class II		445	25.6
Class III		117	6.7
different		277	15.9
unidentifiable		58	3.3
Total		1738	100

Table 2. Frequency and prevalence of normal occlusion and malocclusion among 9-10 year old boys in Tehran

	frequency	count	percent
Molar occlusion			
Class I	normal	66	3.8
	malocclusion	775	44.6
Class II		445	25.6
Class III		117	6.7
different		277	15.9
unidentifiable		58	3.3
Total		1738	100

Table 3. Frequency of deciduous canine occlusion among 9-10 year old boys in Tehran

deciduous canine occlusion	frequency	count	percent
Class I	920	52.9	
Class II	228	13.1	
Class III	94	5.4	
different	200	11.5	
unidentifiable	296	17	
Total	1738	100	

Table 4. Distribution of molar occlusion with respect to deciduous canine occlusion among 9-10 year old boys in Tehran

Canine occlusion molar occlusion	Class I	Class II	Class III	Total
Class I	593 % 6.89	27 % 1.4	42 % 3.6	662 % 100
Class II	153 % 7.47	163 % 8.50	5 % 6.1	321 % 100
Class III	41 % 3.51	7 % 8.8	32 % 40	80 % 100
Total	787 % 7.4	197 % 5.8	79 % 4.7	1063 % 100

Table 5. Frequency of overjet among 9-10 year old boys in Tehran

Molar occlusion	frequency	count	percent
Normal 3-4 mm		541	31/1
Increased	4-7 mm	130	7/5
	>7 mm	8	0/5
Decreased	0-3 mm	1003	57/7
	Reverse	19	1/1
	unidentifiable	37	2/1
	Total	1738	100

Table 6. Frequency of over-bite among 9-10 year old boys in Tehran

Over-bite	frequency	count	percent
Normal 1-2 mm		829	47/7
Increased	2-5 mm	557	32/0
	>5 mm	25	1/4
Decreased	0-1 mm	167	9/6
	Open-bite	104	6/0
	unidentifiable	56	3/2
	Total	1738	100

Discussion

Considering the results presented, only 3.8% of sample subjects were identified to have normal occlusion. The prevalence of normal occlusion in present study is much lower than all available literature in other parts of the world. Several researchers³⁻⁸ have reported the prevalence of the normal occlusion 5-10times higher than us. Ng'ang'a et al. reported normal occlusion 13times of our results. Ingervall² and Altermus³ suggest lower normal occlusion although their results are 3-4times of ours. In comparison to Iranian literature our estimates of normal occlusion is much lower. Compared to our results, reported normal occlusions by Azizi¹⁰, Kharrat Ahari¹¹ and Karampoor¹² are 5-6times and Yaqubi¹³ and Sadeghi¹⁴ 3 to 4 times higher. Accordingly, in Iran, normal occlusion is much less prevalent versus other parts of the world (except Altermus and Ingervall). Only similar result was suggested by Siriwat and Jarabak⁸ which was 0%. The prevalence of malocclusion (76.9%), malocclusion I (44.6%), malocclusion II (25.6%) and malocclusion III (6.7%) had an ascending relationship compared with available Iranian literature^{5,10-14}. Comparing these results with other parts of the world suggest that the prevalence of malocclusion in Iran is either almost similar or higher than other countries; In comparison to our results on malocclusion, Yaqubi, Sadeghi and Karampoor studies report slightly different rates and Azizi, Kharrat Ahari and Ordubazari report higher prevalence in class I.

With respect to other ethnicities, considering the prevalence of malocclusion and class I malocclusion as well, our results are so close to Siriwat and Jarabak.⁸ Five foreign researchers suggest similar findings. 6-8, 15, 16 and Ingervall⁸ report much higher prevalence while Altermus³, Gardner⁵ and Ng'ang'a¹⁶ reported higher rates.

Finally, considering the prevalence of class I malocclusion in Tehran we could say that there is no significant difference between the results of presented studies.

With respect to the prevalence of class II malocclusion, in comparison to other ethnicities globally, Sclare 6 and Sputh 17 reported higher estimates. Siriwat's reported prevalence rates were as twice as ours. All other literature suggests lower rates compared with our results. However, the only similar findings were Sclare's.

Azizi¹⁰ report very low prevalence of class III malocclusion while 3 Iranian researchers suggest higher prevalence 12-14; Kharrat Ahari had lower prevalence. In other parts of the world almost similar findings could be seen.^{7-8,15-16,18} Tang-El¹⁹ reports relatively high prevalence of class III while other 6 researchers suggest lower rates of class III malocclusion.

To find the exact reason behind these differences among the prevalence of various types of occlusion could be so difficult; however, we could say these differences are due to genetic background, type of diet, variety of scales and different instruments and measurement tools. Notably, Angle classification and his definition on normal occlusion were not made for epidemiologic purposes. Also there should be noted that in our study many subjects had different right and left occlusion and some were non examined; however, all these subjects were accurately identified and classified. These subjects were not able to be classified based on occlusion. In few studies, this problem addressed while in many other there is no sign of this problem.

The prevalence of normal overjet in our study was much lower than Isiekwe⁷ and Tang-El¹⁷. Regarding normal overjet, similarity is seen in Karampoor study. With respect to increased over-jet other researchers report higher prevalence.^{7,9,12,13,15} only Ng'ang'a

reported similar results. In Iran, highest prevalence of decreased overjet is reported by present study while Karampoor and Tang-El suggest much lower rates. Respected to reverse overjet Similarity could be seen between Karampoor and our findings.

Our findings on normal overbite are resembling Karampoor's. Tang-El and Isiekwe report higher and lower prevalence, respectively. The prevalence of increased over bite is identical Tang-El's. Sadeghi's findings are close to ours. Other researchers 7,11-13,15 report lower prevalence. Ng'ang'a's results were much lower than us. With respect to decreased overbite, Ng'ang'a, Isiekwe and Tang-El report similar results. However, Karampoor reports much higher prevalence of decreased overbite. The prevalence of anterior openbite is similar to Sadeghi and Kharrat Ahari findings while others suggest higher estimates.^{7,9,17,13,12}

These differences in anterior relationships within the literature could be due to these factors: different age groups examined, ethnicity, diet and genetic backgrounds.

In present study the prevalence of cross bite was 3.2% which slightly close to Karampoor report. Other results reported by Iranian researchers show relatively higher prevalence of crossbite among Iranian population. Posterior crossbite of which the prevalence was 0.7% is slightly close to Karampoor and Kharrat Ahari findings while other Iranian literature suggests higher estimates. In present study the prevalence of anterior cross bite was 2.5% which is lower than Karampoor report but much lower than other Iranian researches.

Finally, considering high prevalence of malocclusion either Class I, II or III it seems that in addition to awareness of the role of genetic issues in transmitting these malocclusions, utilizing orthodontic preventive methods in different age groups

especially in deciduous stage should be highlighted.

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